REMARKS

Reconsideration of the application is respectfully requested.

I. Status of the Claims

Claims 1 – 6 are presently pending. Applicants cancel claim 3 without prejudice or disclaimer, and amend independent claim 1 to incorporate a portion of canceled claim 3. No new matter is introduced.

II. Rejections Under 35 U.S.C. § 103

Claims 1 - 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication No. JP 60-13826 to Tsuchida et al. ("Tsuchida") in view of Japanese Patent Publication No. JP 10-335128 to Shinji et al. ("Shinji"). Applicants cancel claim 3 without prejudice or disclaimer. Therefore, the rejection as to claim 3 is moot. Applicants amend independent claim 1 to incorporate a portion of canceled claim 3, and respectfully traverse the rejections of claims 1, 2 and 4 – 6 under 35 U.S.C. 103(a).

In amended independent claim 1, Applicants claim:

1. A powder core comprising: a plurality of composite magnetic particles bonded to each other;

Wherein each of said plurality of composite magnetic particles includes:

a metal magnetic particle,

an insulative lower layer coating surrounding a surface of said metal magnetic particle,

an upper layer coating surrounding said lower layer coating and containing silicon, and

dispersed particles containing a metal oxide compound and disposed in said

upper layer coating and/or said lower layer coating;

wherein said dispersed particles includes at least one oxide selected from the group consisting of silicon oxide and aluminum oxide; and

wherein a mean particle diameter R of said dispersed particles meets a condition 10 nm < R ≤ 2T, where T is an average thickness of a coating formed from said lower layer coating and said upper layer coating.

(Emphasis added).

Tsuchida discloses a composition for use in plastic magnets, comprising a thermoplastic resin binder and a powder of a metallic or alloy-type magnet which is surface-coated with a phosphorus-containing compound (see, e.g., abstract of Tsuchida).[1] The powder is overcoated with an organopolysiloxane (a silicon-containing compound). In sharp contrast to Applicants' powder core as claimed in amended independent claim 1, the Examiner acknowledges that Tsuchida fails to disclose a particulant dispersant of metal oxide. However, the Examiner suggests that this deficiency is overcome with the addition of Shinji.

Shinji discloses a ferromagnetic powder to be used for forming a dust core (see, e.g., abstract of Shinji). Shinji teaches adding titanium oxide (titania) sol or zirconium oxide (zirconia) sol to a ferromagnetic powder to enhance mechanical strength without degrading magnetic performance. However, and in sharp contrast to Applicants' amended independent claim 1, Shinji does not teach or suggest that the particulant dispersant comprises a metal oxide selected from the group consisting of silicon oxide and aluminum oxide. Applicants submit therefore that, for at least this reason, amended independent claim 1 is not obvious in view of Tsuchida and Shinji, and stands in condition for allowance.

As claims 2 and 4 – 6 each depend from allowable independent claim 1, Applicants submit that dependent claims 2 and 4 – 6 are also allowable for at least this reason. Applicants further submit that dependent claims 5 and 6 are also allowable on additional grounds.

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[1] Citations in this action to Tsuchida are made with reference U.S. Patent No. 4,497,722, which corresponds to the Japanese publication.

Claims 4 and 5 add as further elements to claim 1 that the lower and upper layer coatings applied to the metal magnetic particles, respectively, have "an average thickness of at least 10 nm and no more than 1 micron." Claim 1 also provides that "a mean particle diameter R of said dispersed particles meets a condition 10 nm < R ≤ 2T, where T is an average thickness of a coating formed from said lower layer coating and said upper layer coating."

In reference to claims 4 and 5, the Examiner states the following:

> Tsuchida discloses that the content of phosphorus-containing compound as the insulating coating is 0.01 – 5 wt%; and the content of the silicon-coating compound present in the coating is 0.02 to 2 wt% of the magnetic powder. Therefore, the resulting thickness of the coating is expected to be within the claimed range. In addition, the thickness of the coatings as claimed would have been obvious through routine experimentation."

Applicants respectfully disagree. Because Tsuchida discloses only weight relationships between the coating layers and the magnetic particles together with some size information with regard to the magnetic particles (see, e.g., Col. 4: 3 – 5 of Tsuchida), it is unlikely that the range of coating thicknesses that might be imputed for the Tsuchida composition from these relationships precisely discloses Applicants' claimed coating thickness ranges. Moreover, Applicants do not agree that the claimed ranges would have been obvious through routine experimentation.

Only recognized "result-effective" variables can be the subject of routine optimization (see, e.g., MPEP § 2144.05(II)(B), citing *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)). Through significant inventive effort, Applicants discovered that the following results were possible when particle sizes and coating thicknesses were limited to the claimed ranges and relationships:

> The dispersed particles disposed on the lower layer coating and/or the upper layer coating act as a spacer separating adjacent metal magnetic particles when compacting is being performed to make the powder core. Since the mean particle diameter R of the dispersed particles exceeds 10 nm, the dispersed particles will not be too small. As a result, insulative particles can serve adequately as spacers between the metal

magnetic particles, thus providing more reliable reduction of eddy current loss in the powder core.

Also, the mean particle diameter R of the dispersed particles is no more than twice the thickness T of the coatings. Thus, the mean particle diameter of the dispersed particles will not be too large relative to the thickness of the coatings, allowing the dispersed particles to be supported in the coatings in a stable manner. As a result, dispersed particles are prevented from falling out of the coatings, making it possible to obtain the advantages of the dispersed particles described above in a reliable manner. Also, when compacting is performed to form the powder core, the dispersed particles do not obstruct plastic deformation of the metal magnetic particles, making it possible to increase the density of the shaped body obtained after compacting. Furthermore, during compacting, the dispersed particles prevent the upper layer coating and the lower layer coating from being destroyed and limit formation of gaps between adjacent metal magnetic particles. As a result, the insulation between the metal magnetic particles can be maintained and demagnetization fields can be prevented from forming between particles. Furthermore, by using a two-layer structure for the coating, the upper layer coating and the lower layer coating can slide and shift relative to each other during compacting. This prevents the upper layer coating from tearing during deformation of the metal magnetic particle, thus providing a uniform upper layer coating that acts as a protective coating.

(Page 6, line 15 – page 7, line 18 of Applicants' specification).

Thus, the claimed ranges and relationships between dispersant particle size and coating thicknesses were determined according to Applicants' substantial investigation of the behavior of the dispersant particles in the upper coating layer of particles in the powder core. Significantly, neither Tsuchida nor Shinji speak at all to the behavior of the dispersant particles in the upper coating layer, or to dispersant particle size and coating thickness as means for controlling this behavior.

Applicants respectfully therefore that the combination of Tsuchida and Shinji fails to precisely teach the ranges of dispersant particle sizes and layer thicknesses claimed by Applicants. Moreover, absent an understanding of intended results achieved within the ranges claimed by Applicants, Applicants further submit the claimed ranges and relationships would not be obvious to one having routine skill in that art at the time of invention, in view of the cited references, as a

matter of routine experimentation. As a result, Applicants submit that claims 4 and 5 are not obvious in view of Tsuchida and Shinji for this additional reason.

Therefore, Applicants respectfully request that the rejections of claims 1, 2 and 4 – 6 under 35 U.S.C. 103(a) be withdrawn.

CONCLUSION

In view of the above amendments and remarks, Applicant believes the pending application is in condition for allowance. If there are any remaining issues which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

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Respectfully submitted,

By _____

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